LLC-BA

BATCH CONTROLLER

Operation & Installation Manual

Rev. 2

AW GEAR METERS

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Safety Definitions and Information

Do not attempt to install or use your AW Gear Meters product until you have read the safety instructions in this section. Save this manual and keep it in an easily accessible place.

Warning!

Warning means that failure to follow this safety statement may result in extensive product damage, serious personal injury, or death.

Caution

Caution means that failure to follow this safety statement may result in minor or moderate personal injury, property or equipment damage.

Notice

Notice is a statement that informs about installation, operation, maintenance, performance issues, or general tips that are important but do not create a hazard or safety concern.

Unpacking

Separate the flow monitor from packaging materials and check for any visual signs of damage. If you determine there has been damage caused by shipping, file a claim with the shipping company. If the flow monitor appears to have been improperly assembled or does not operate properly, return it for replacement or repair (see Limited Warranty information at the end of this manual).

Caution

Before connecting, programming, or operating the LLC-BA Batch Unit, read this manual.

Quick Start Guide

Caution

As with any precision-engineered device, always operate the LLC-BA Batch Unit in accordance with the manufacturer's instructions.

Connect to Flow Transmitter

You will connect three wires from the sensor to the back of the LLC-BA:

- a red wire (electrical power)
- a white wire (signal), and
- a black wire (ground)

Notice

Color of wires may vary.

Insert the end of the red wire into upper connection #1 and use a screwdriver to secure. Insert the end of the black into upper connection #2 and the end of the white wire into upper connection #3. Use a screwdriver to secure.

Relays-to-Solenoid Connections

In a two-valve system, connect the 110VAC power wire from the optional high flow valve to upper connection #5, neutral to #7; and connect power wire from low flow valve to upper connection #8 and neutral to upper connection #10.

Other Connections

Other connections may be required, depending on your system. These include connections for remote input/output devices, PLCs, and computers. See Input and Output Wiring Connections on page 9.

Connect Unit to Power

Insert the female end of the 110VAC adaptor into the AC 16V input at the back of the LLC-BA. Plug the adaptor into a wall receptacle.

Basic Key Definitions and Key Strokes

The LLC-BA has four keys for data input and programming:

- DN (down)
- UP (up)
- SEL (select)
- ENT (enter)

Use the SEL key to isolate the data you would like to enter. Use the UP and DN keys to move the cursor as desired and to enter information. Use the ENT key to confirm data and to enter information into the LLC-BA. Find complete programming information in the Programming the LLC-BA section on page 20.

Enter KFR and KFT Factors

The Calibration Sheet packed with the flow meter(s) includes the KFR and KFT factors. To program these variables and the appropriate enginnering units, see the section on Programming the LLC-BA beginning on page 20.

Product Description

The LLC-BA allows accurate control a small- to medium-sized fluid batch system. The microprocessor-controlled design allows you to select from nine different batches and provides START, STOP, or RESET functions. While the batch is going through its cycle, the LLC-BA monitors the operation and informs you if the batch is RUNNING, PAUSED, or DONE. The device also can monitor two different flow rates to allow for a slow stop/start of the flow and can show a combined flow rate.

The LLC-BA's Automatic Over-Run Compensation function corrects any overrun on the next batch. This feature is always active and adapting continuously to correct for long-term changes in valves and fluid characteristics.

Features

- Easy-to-read LCD display
- Batch/totalizer data retained up to five years
- Dust and chemical resistant Lexan® front panel
- Panel mount enclosure
- Two valve-control outputs
- Customizable industrial enclosures available

Principle of Operation

After the user enters the batch amount into the controller, the unit monitors the batch either up from zero or down to the batch amount depending on user choice. The user can program nine different batches into the LLC-BA and have access to all of them.

Technical Data

Enclosure

- DIN #43700, panel mount, plastic
- Height = 67mm/2.6 inches; height w/ flange 69mm/2.8 inches
- Width = 92mm/3.6 inches; width w/ flange = 97mm/3.8 inches

- Depth = 132mm/5.2 inches; depth w/ flange = 139mm/5.5 inches

Lexan® is a registered trademark of SABIC Innovative Plastics.

Weight

- 12 0z. (approx. 360 grams) without power supply

Environment

- Storage: -40 to 85 deg. C
- Operating: 0 to 50 deg. C (standard)
- Humidity: 10-90% non-condensing

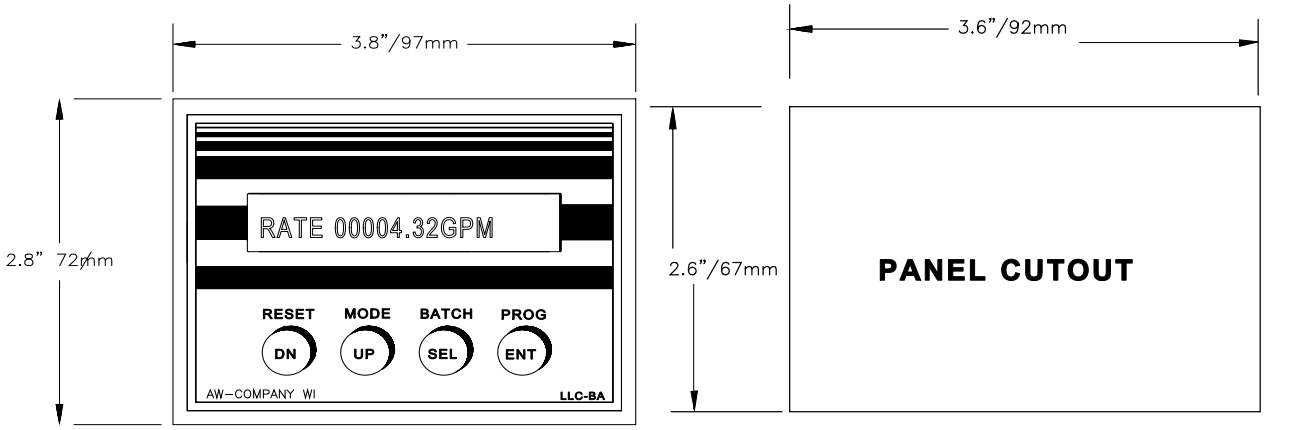
Power Supply

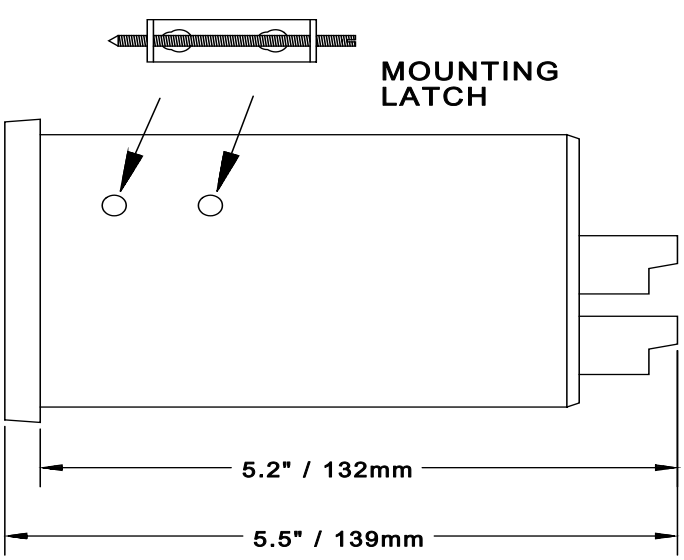
- Supplied: 110VAC wall plug unit -16VAC/1000mA output w/6ft. cable to standard 2.1mm I.D. x 5.5mm O.D. female plug
- Allowable supply range: 12-16VAC/300mA or 15-24VDC/300mA
- Frequency Input: voltage triggered, 2.00 volt min. input level, 0 - 4KHz, 10KOhm imp.
- Supply Output: (to sensor) approx. 20mA at approx. 15VDC
- Relay Outputs: 2 Form C relay outputs (see table below for contact rating information)

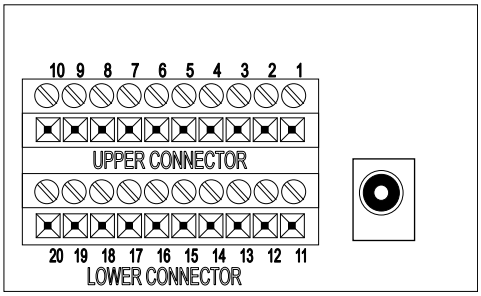
Relay Contact Ratings

Maximum Switched Power	Resistive Load	DC: 60W AC: 125VA
	Inductive Load	DC: 30W AC: 60VA
Maximum Switched Voltage		220V DC, 250V AC
Maximum Switched Current		2A
Rated Load	Resistive Load	DC: 30V, 2A AC: 110V, 0.5A
	Inductive Load	DC: 30V, 1A AC: 110V, 0.3A

Dimensional Drawings







Input and Output Wiring Connections

Make all connections to the LLC-BA from the back of the unit. A plug-in connector from the wall plug-type power supply, normally supplied with the unit, delivers power. If necessary, any standard AC wall plug unit providing 13-17VAC/250mA. or 15-24VDC/250mA. may be used. A standard female plug (2.1mm I.D. x 5.5mm O.D.) supplies AC or DC power to the LLC-BA. The factory recommends tying one of the DC COMMON terminals to earth ground, especially for DC operation.

Make all other connections through two terminal connectors. Called the “upper” and “lower” connectors, they are removable and have ten connections each. A label on each connector shows connection information. Refer to the Connection Diagram on page 12 for details and typical batch application connections.

Upper Connector Terminal Designations

TERM 1 — +15VDC Power supply for the transmitter. Approximately 15VDC (power supply dependant), approximately 20mA maximum. Source for pull-up resistor if required.

TERM 2 — GROUND (floating); power supply negative for the transmitter.

TERM 3 — SIGNAL frequency input from the transmitter. 0-4KHz, 2 volts minimum, 10KOhm input impedance. A pull-up resistor is required for pickups with a sinking output. Size resistor not to exceed rated output current of pickup. Typical pull-up values range from 2.2Kohm to 5.1Kohm

TERM 4 — RUN/PROG Input. Enables RUN Mode and EXTERNAL functions when connected to GROUND (TERM 2). When open, LLC-BA is in the PROGRAM Mode.

Notice

This input must be activated with a dry contact.

TERM 5 — REL2COM is the common contact of Relay 2 (Form C). Relay 2 is used in batching applications to control the high flow solenoid valve in a two valve system with slow start/stop function. See Connection Diagram page 12 for solenoid connection details. See table on page 7 for relay contact ratings.

TERM 6 — REL2NC is the normally closed contact for Relay 2.

TERM 7 — REL2NO is the normally open contact for Relay 2.

TERM 8 — REL1COM is the common contact of Relay 1 (Form C). Relay 1 is used in batching applications to control the low flow solenoid valve in a two valve system with slow start/stop function. See Connection Diagram page 12 for solenoid connection details. See table on page 7 for relay contact ratings.

TERM 9 REL1NC is the normally closed contact for Relay 1.

TERM 10 REL1NO is the normally open contact for Relay 1.

Lower Connector Terminal Designations

TERM 11 VOLTAGE SUPPLY OUTPUT - 15 VDC, 25 mA

TERM 12 GROUND for External Function Inputs (1-4)

TERM 13 ANALOG OUTPUT SELECT – Connect to TERM 11 to change the function of the analog output from a Batch Progress Signal to a Batch Number Signal (software revision 1.18 and above only).

TERM 14 INPUT1, START/STOP Input (momentary) for batching applications. Start/Stop is accomplished by momentarily connecting INPUT1 (TERM14) to GROUND (TERM 12). Batch start occurs on the rising edge of the signal as the connection opens. If input closes again before the batch total is reached, stop occurs on the falling edge of the signal as the connection closes. Batch function resumes on the rising edge of the next momentary closure of the STOP/START input. START/STOP function is active in RUN mode.

TERM 15 INPUT2, BATCH RESET Input (momentary) for batching applications. Batch Reset is accomplished by momentarily connecting INPUT2 (TERM15) to GROUND (TERM 12). When connected, the batch operation terminates and the batch totalizing value resets to zero on the falling edge of the signal as the connection is closes. Reset function is active in RUN mode.

TERM 16 INPUT3, BATCH SELECT Input (momentary) for batching applications. Used for selection of pre-programmed batch quantities (batch 1- 9) while in the RUN mode. Batch number increments and display indicates batch and batch quantity while the input is closed.

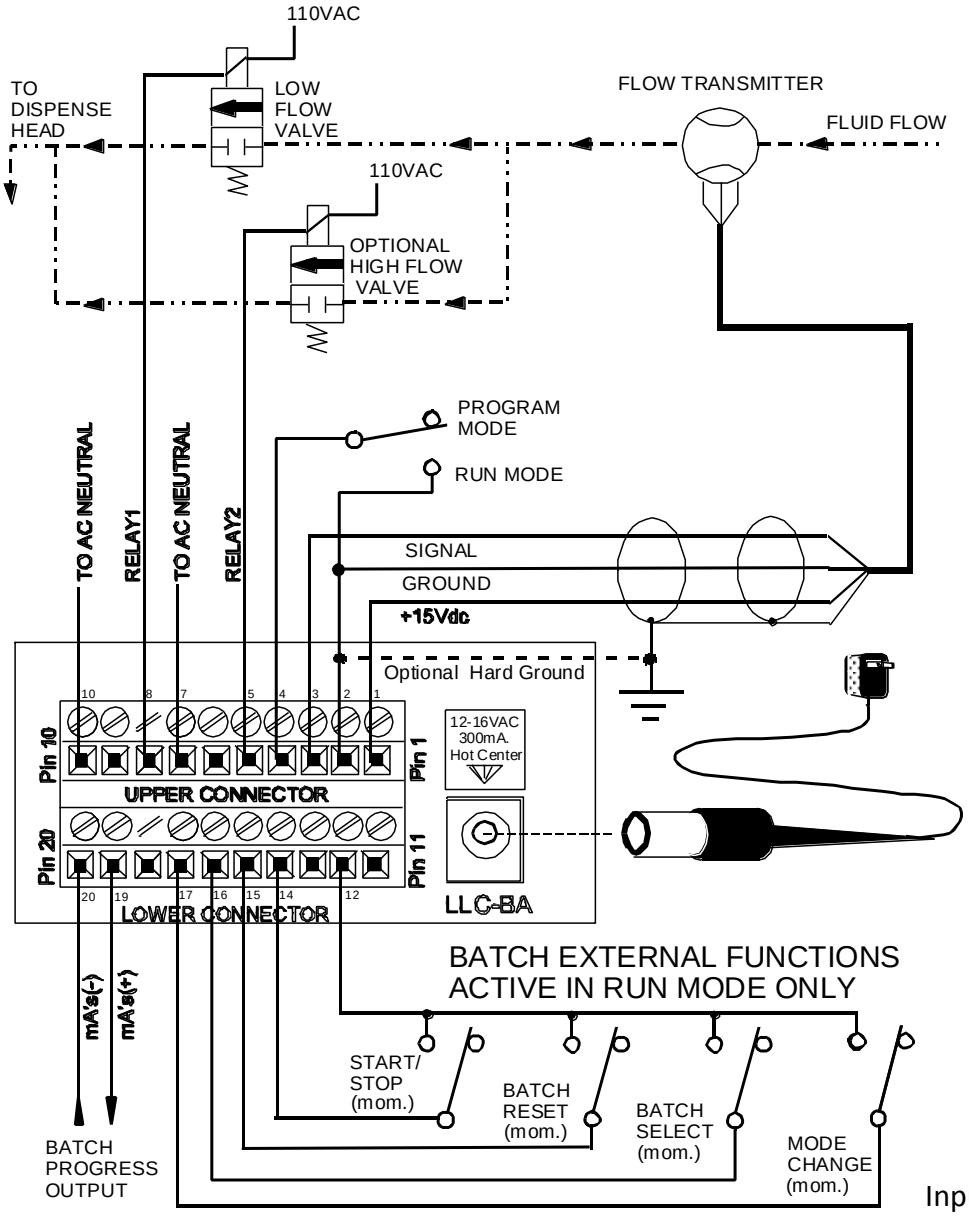
TERM 17 INPUT4, MODE CHANGE Input (momentary) for batching applications. Used to select the display mode while operating in the RUN mode. Display mode increments on each closure of the input.

TERM 18 NO CONNECTION

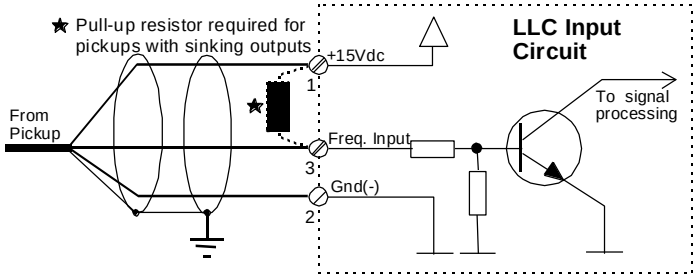
TERM 19 mA's (+), positive of mA's output, this analog output is a batch progress signal, or with software revision 1.18 or higher can alternately indicate the batch number. A Batch Progress Signal directly corresponds with the progress of the batch where 4mA equals zero progress and 20mA is equal to the full batch amount. A Batch Number Signal (software revision 1.18 and above only) indicates the currently selected batch number in

	1 mA increments with 5 – 13mA representing batch numbers 1-9. To assign the output to the Batch Number Signal function, wire a jumper between terminals 11 and 13.
TERM 20	mA's (–), negative of mA's output - see mA's (+) above.

Typical Connections



Input Circuit (detail)



LLC-BA Initial Messages

After five seconds the LLC-BA briefly displays *****AW Company***.** Then the unit displays the following four variables for approximately two seconds each:

- **VERSION a w 1 . XX** – the software version installed in the LLC-BA.
- **ON COUNT -> 00000XX** – how many times the unit has been powered up; increments each power-on cycle.
- **LEFT MEM%0000100** – percent of memory life remaining in 10% increments. The LLC-BA stores variables and totalizer values in EEPROM (electrically erasable programmable read-only memory), not a battery. Limits to the number of times memory can be re-written results in a minimum EEPROM life of five years with continuous use. Memory IC is replaceable on-site.

Notice

Be careful to insert the new memory IC in the exact orientation as the one you removed. You must re-program variables after changing the memory IC.

- **BLK LOC 0000XXX** – Block Location the LLC-BA uses for EEPROM memory management.

After these brief displays, the LLC-BA enters the Display Mode.

Display Modes

The user selects the Display modes differently in the **PROGRAM** Mode and in the **RUN** Mode.

When in the **PROGRAM** Mode, press the UP to change the display mode from one to the next. When in **RUN** Mode, change the display mode by pressing UP or by momentarily closing the MODE CHANGE input (external device such as a remote indicator, PLC or computer).

The LLC-BA retains the selected display mode when powered down and displays the same mode at power up. A representation of a typical display follows the descriptions below.

RATE

In the RATE mode, the unit displays the rate in engineering units to the programmed decimal place and based on the KFR factor. The word RATE appears at the beginning of the display to indicate mode.

RATE 00000.34 GPM

TOTALIZER 1 (TO1)

In TOTALIZER 1 mode, the LLC-BA displays the total of the currently programmed BATCH in progress. Totalizer 1 resets to zero on a START input when in RUN mode and counts up to the batch amount. The LLC-BA retains this total with power removed. The display is based on the programmed KFT value, KFT engineering units, and decimal point.

TO1 000000.0 GAL

TOTALIZER 2 (TO2)

In TOTALIZER 2 display mode, the LLC-BA displays the current total accumulating in Totalizer 2 (Grand Totalizer). Totalizer 2 accounts for all totalized flow; the user can only reset this value in the PROGRAM mode. The LLC-BA retains this total with the power removed. Display is based on the programmed KFT value, KFT engineering units and decimal point.

TO2 000000.0 GAL

BATCH Status

Indicates the state of the currently selected batch and whether the batch is RUNNING, PAUSED, or DONE. It does not indicate actual batch progress.

BATCH 1 DONE

TO1 (REVERSE TOTAL 1)

Displays batch quantity when START input is closed and counts downward to zero at batch completion in the reverse function of Totalizer 1. Display is reset with Totalizer 1. The LLC-BA retains this total with the power removed. Display is based on KFT value, KFT engineering units, and decimal point.

TO1- 00000.00 GAL

Operations/Reset of Totalizers

The LLC-BA has two independent totalizers

- TO1 (Totalizer 1) is the dedicated batch totalizer
- TO2 (Grand Totalizer) keeps a running total of all flow

TO1 and TO2 rollover at 9999900 regardless of where the decimal is located. With power removed, the LLC-BA retains totals.

Notice

Retained totals may not reflect the exact totalizer or batch value at the instant the power is removed because these variables only update once every 15 seconds.

Totalizer 1

Maintains a total of the batch currently running. In RUN Mode, a momentary closure of the BATCH RESET input resets TOT1. Reset occurs when the user implements START at the start of each batch or BATCH with the SEL key.

To reset Totalizer 1 in the PROGRAM Mode, select TO1 using the UP key and press RESET. TO1 resets to zero and the TO1- display (inverse TO1) resets to the quantity of the active batch.

Totalizer 2

Totalizer 2 (Grand Totalizer) totalizes all flow. Totalizer 2 can only be reset when the LLC-BA is in PROGRAM mode (TERM 4 not connected to TERM 2) while in TO2 display mode. TO2 is not reset by any other function.

To reset TO2**,** select PROGRAM mode by opening the RUN/PROG Input (TERM 4), select the TO2 display mode using the MODE key (UP), and press the RESET key (DN); Totalizer 2 resets and starts accumulating from zero.

Caution

Be careful: when in PROGRAM mode, Totalizer 2 can be reset in TO2 Display Mode with only the RESET key.

Operating Modes

The LLC-BA has two operating modes:

- PROGRAM Mode and
- RUN Mode

Use PROGRAM Mode for:

- programming variables and batch quantities, or
- for reset of Totalizer 2.

Use RUN Mode:

- to enable batch operation and the associated inputs.

RUN/PROG input selects the operating modes. When closed, RUN Mode is enabled. When open, LLC-BA is in the PROGRAM Mode. (See Connection Diagram on page 12.)

RUN Mode

In the RUN Mode, the external batch functions inputs are active. (See the Connection Diagram on page 12.) Two keys are active on the front panel:

- the MODE key (UP) changes the display
- BATCH (SEL) starts or stops a batch

Batch Operation

When you press START or BATCH, the LLC-BA initiates and then stops flow when the batch quantity is reached. You can select one of nine programmable batches using “Batch Select.”

The RELAY outputs control two solenoids with different flow rates to allow for a slow stop/start of the flow. In a typical batch cycle:

1. Pressing START (or the BATCH key [SEL]) activates the low flow solenoid. When the (user programmed) DELAY time is reached, the RELAY2 Output (high flow solenoid) activates. These two actions together produce a combined high flow rate.
2. RELAY2 Output (high flow solenoid) deactivates before the batch quantity is reached by means of the PRECUT variable reducing the flow for a slow stop.
3. RELAY1 (the low flow solenoid) deactivates when the programmed batch quantity is reached.

Automatic Overrun Compensation

The de-activation of RELAY1 is under the influence of the Automatic Overrun Compensation (AOC) feature that compensates for a valve or fluid delay in the batch system. For example, if a valve with a .5 second reaction delay is used on a 1000cc batch, the first quantity delivered is approximately 1020cc, depending on flow rate.

The AOC feature detects this overrun and the LLC-BA anticipates and corrects for the delay on the next batch. The feature is always active and adapting continuously to correct for long term changes in valve and fluid characteristics.

Batch Selection/Activation

While in the RUN mode, use BATCH SELECT to select and activate a batch number 1- 9. Close and hold the input to select a batch number. On each closure, the batch number increments by one. The display reads SEL B# 000xx.xx to indicate the current batch number and quantity. Releasing the input activates the Batch selection and returns the display to the Display Mode. Repeat until the desired batch displays.

Notice

You cannot select or activate batch numbers with a zero quantity. The BATCH SELECT advances to the next batch with a non-zero quantity.

Use the BATCH key (SEL) and ENT to activate batches in PROGRAM mode. See Programming Mode for details.

Batch Input and Output Functions

The following inputs and outputs are active in the RUN Mode for batch operation. They function as follows:

INPUT1

Momentarily closing INPUT1 activates START/STOP. Batch START occurs on the rising edge of the signal as the connection opens. If the input closes again before the batch total is reached, STOP occurs on the falling edge of the signal as the connection closes; Batch Status is PAUSED. Batch function resumes on the rising edge of the next momentary closure of the STOP/ START input. The BATCH key (SEL) also functions as the STOP/START input in the RUN mode.

INPUT2

Momentarily closing INPUT2 activates BATCH RESET. Batch operation terminates and the batch totalizing value resets to zero on the falling edge of the signal as the connection closes.

INPUT3

The LLC-BA uses the BATCH SELECT Input (momentary) to select and activate a batch number (batches 1-9). The active batch number increments on the closure. While the input is held closed, the display indicates the batch number and batch quantity. When the input is opened, the display returns to the Display Mode.

INPUT4

The LLC-BA uses MODE CHANGE Input (momentary) to select the Display mode. The display mode increments on each momentary closure of the input or will auto-increment through the modes if the input is held closed. Release the input to select the mode when displayed. You can also change the display mode using the MODE key (UP).

RELAY1

The START Input or BATCH key (SEL) activates Output (low flow solenoid) and deactivates it when the programmed batch quantity is reached.

RELAY2

Output (high flow solenoid) activates after the DELAY variable activates RELAY2. The PRECUT variable deactivates it before the batch quantity is reached.

mA's (+/-) OUTPUT

Active in the RUN mode, this analog output is a batch progress signal; it can also indicate the batch number (software revision 1.18 or higher). The mA output is available on terminals 1 and 2 of the main terminal strip.

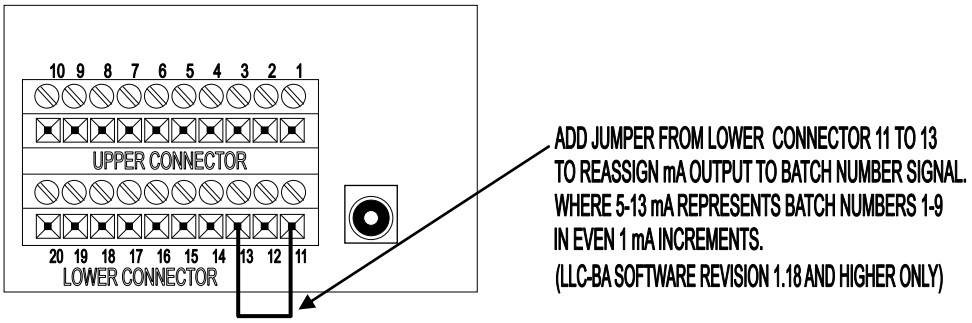
Batch Progress Signal

Directly corresponds to the progress of the batch where 4 mA equals zero progress and 20mA is equal to the full batch amount.

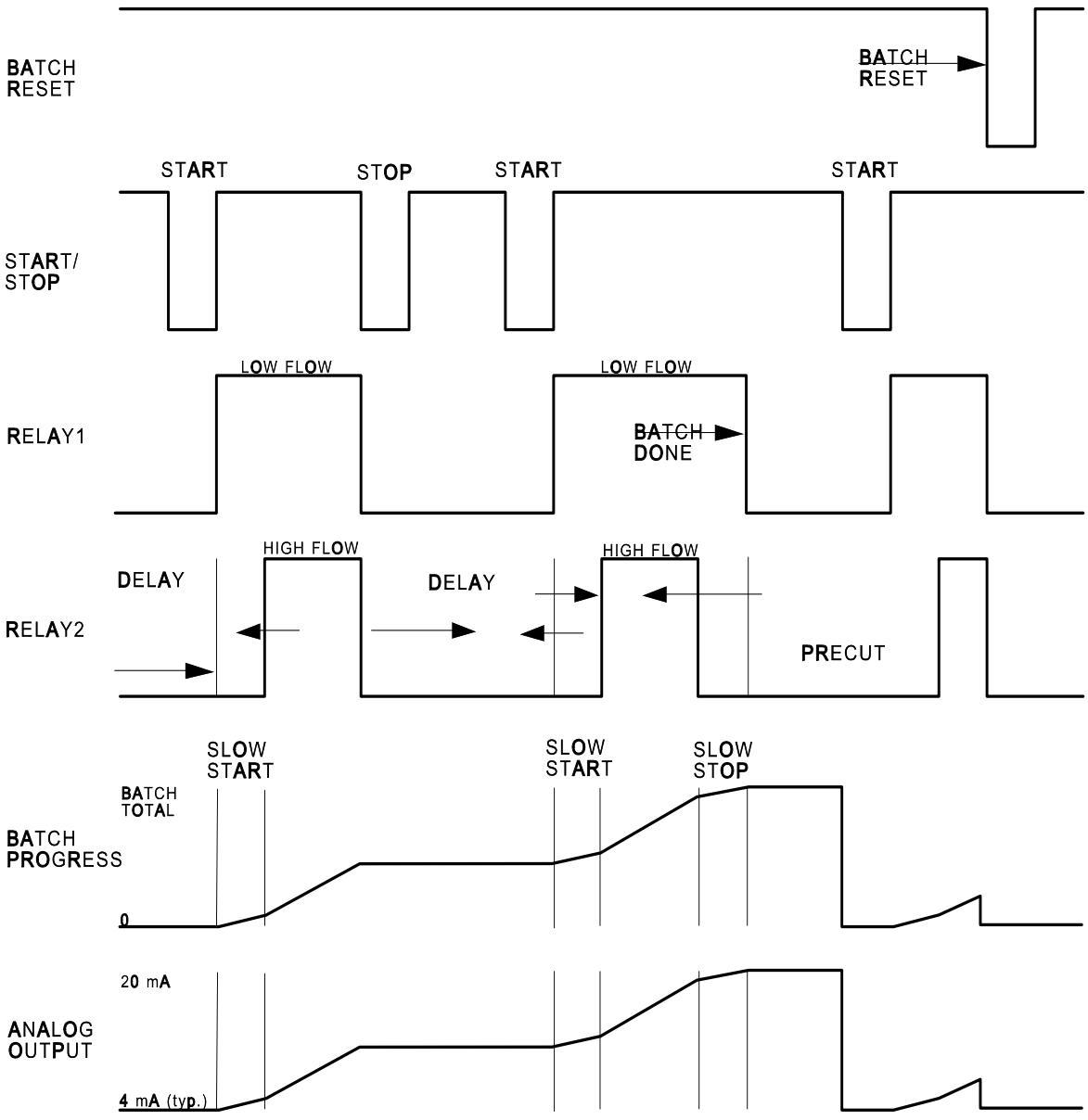
Batch Number Signal

mA value indicates batch number in 1mA increments with 5 – 13mA representing batch numbers 1-9. To assign the output to the Batch Number Signal function, wire a jumper to the back of the LLC-BA between terminal 11 and terminal 13 (see following diagram).

Changing Analog Output Function



Batch Function Timing Diagram



Programming the LLC-BA

The LLC-BA user will need to edit the default Batch quantities as well as the default application- dependant variables shown in the Programming Label Diagram.

The KFR and KFT scaling variables shown underlined in the Label Diagram at the right are the default values, which display the rate in Hertz and the totals in pulses. If the values differ from the underlined variables, the AW Gear Meter factory may have already programmed the device for the K-factor in the requested engineering units.

AW Gear Meters Originally Programmed Values			
DELAY	00000.50		
PRECUT	0000000.	BATCH 1	100.00
GATE TIME	0000001.	BATCH 2	000.00
0-set mA's	000x.xx	BATCH 3	000.00
KFR RATE	00100.00	BATCH 4	000.00
DP KFR	00000.00	BATCH 5	500.00
ENG UNITS	hz	BATCH 6	000.00
KFT TOTAL	0010000.	BATCH 7	000.00
DP KFT	00000000.	BATCH 8	000.00
ENG UNITS	pul	BATCH 9	900.00
SER NR >	example	MODEL LLC - BA	
	AW Gear Meters	262-884-9800	
	8809 Industrial Dr.	Franksville, WI 53126	

If the values on the LLC-BA label are the same as the underlined defaults shown here, the KFT and KFR scaling variables require editing to display the required engineering units. See Entering/Editing the Variables below for directions.

Program Mode

Use Program Mode to enter, edit, or examine variables and batch quantities.

Notice

You must enter variables before batch programming.

The PROGRAM/RUN input must be open (TERM 4 not connected to TERM 2) to enter the PROGRAM mode.

Entering/Editing Variables

To enter Program Mode:

1. Press and hold the PROG key (ENT). The display will start flashing PROGRAMMING ????.
2. When the display stops flashing, release the PROG key (ENT)

The LLC-BA now displays the first variable, DELAY, and is ready for you to enter, edit or examine the variables. After you have viewed/edited and stored each variable, the LLC-BA advances to the next variable.

The factory default value follows the instructions below.

DELAY

This variable sets the delay time for Relay2 (high flow solenoid output) relative to the START input. Typical delays are from 0.00 to 4.00 seconds. This function is used in slow start applications where Relay1 (low flow solenoid output) is energized immediately at a START input and Relay2 (high flow solenoid output) is turned on after the DELAY time.

00000.50 seconds

Press and hold UP or DN to increase or decrease the value.

To increase the increment or decrement rate:

- for medium, press and hold SEL while holding UP or DN
- for maximum, press and hold ENT while holding UP or DN

When the value displays, press the ENT to store it and advance to the next variable.

Notice

Always release SEL or ENT before releasing UP or DN, or the LLC-BA will proceed to the next variable leaving the last variable with an unpredictable value.

PRECUT

This variable sets the batch quantity remaining when Relay2 (high flow solenoid output) is turned off. Program using the KFT engineering units and decimal point. This function is used in slow stop applications where Relay2 (high flow solenoid output) is turned off at a PRECUT amount before the total batch quantity is reached and Relay1 (low flow solenoid output) remains energized until the batch quantity is reached.

0000000 pulses

Press and hold UP or DN to increase or decrease the value. To increase the increase or decrease rate, while holding the UP or DN, press and hold the SEL for medium rate or ENT for maximum rate. When the desired value is displayed, press ENT to store the programmed value and advance to the next variable.

Notice

Always release SEL or ENT before releasing UP or DN, or the LLC-BA will proceed to the next variable leaving the last variable with an unpredictable value.

Gate Time

This variable sets the sampling time for display of the incoming frequency. You will program it in complete seconds and the allowable range is from 1 to 30 seconds. The variable only affects the update of the display and is useful in stabilizing the display when dealing with variations in flow. In low rate

situations (below 10Hz), the LLC-BA converts automatically to pulse-width measurement to increase the accuracy of the display.

0000001 seconds

Notice

The display will not function if this variable is set to zero!

Use UP or DN to increase or decrease the value. Press ENT to store and advance to the next variable.

0-set mAs

This variable is used to set the lower range of the Batch Progress mA output and as a fine offset adjustment for the output. Program with two decimal places of accuracy. The allowable range is 0.00mA to 10.00mA. This variable is factory-set to produce a measured 4.00mA at the output but you can change it to suit your application or for fine offset adjustment of the output.

0000x.xx mA (typ. 3.9*x* to 4.0*x*)

Notice

This variable only adjusts the analog output and does not affect the display.

Use UP or DN to increase or decrease the value. Press ENT to store and advance to the next variable.

KFR-Factor

For the LLC-BA to display data in an engineering unit such as GPM, you must program an appropriate scaling factor. This factor is the KFR factor. KFR is caluculated using the K-factor of the transducer being monitored. The K-factor is the number of impulses per engineering unit established by the transducer manufacturer or by a calibration test.

00100.00 (factory default displays Hertz to two decimal places)

To calculate the KFR factor, use the following formula:

KFR = TIME BASE CONSTANT/K-FACTOR

where:

- 100 is the time base constant for engineering units per second
- 6000 is the time base constant for engineering units per minute
- 360000 is the time base constant for engineering units per hour
- K-FACTOR is the average number of pulses per desired engineering unit that the transducer produces.

Remove the insignificant decimals often produced with this calculation as they result in displays with a misleading level of precision far exceeding the accuracy of the meter. Use a maximum of four digits regardless of decimal point position! Enter KFR without regard to the location of the decimal point in the display. **Enter the desired decimal location in the next procedure**. The largest acceptable number for KFR is 65535.

For example:

A flowmeter has a K-factor 2053.7 imp/Gal and the display should read in Gal/Min.

KFR = 6000/2053.57 = 2.921741 for GPM

292174 is > 65535! 29217 > 4 digits! 2922 is best! Enter 2922 for KFR. For this example, KFR=2.922, the decimal point is set to three decimal places in the next procedure.

Set Decimal Point

Press and hold UP or DN to increase or decrease the value. To increase the increment or decrement rate, while holding the UP or DN key, press and hold SEL for medium rate or ENT for maximum rate. When the desired value is displayed, press ENT to store the programmed value and advance to the next variable.

Notice

Always release the SEL or ENT key before releasing the UP or DN key or the LLC-BA will proceed to next variable leaving the last variable with an unpredictable value.

Decimal Point for KFR

This variable selects the location of the decimal point in the KFR factor and the display. This display is always zeros with a decimal point.

00000.00 (factory default)

Use the UP or DN key to move the decimal point left or right. Press ENT to store and advance to the next variable.

Engineering Units KFR

Enter the engineering units for display of rate with up to three characters or letters. Example: gpm

hz_ (factory default)

Program or edit the left-most character first. Press UP or DN until it appears. Then press SEL to store. Repeat the procedure for the second character. Repeat for the 3rd character but store with the ENT key. The next variable will display.

KFT-Factor

For the LLC to display in a desired engineering unit such as Gallons, the user must program an appropriate scaling factor, called the KFT factor. The KFT is calculated using the K-factor of the transducer being monitored. The K-factor is the number of impulses per engineering unit established by the transducer manufacturer or by a calibration test.

0010000. (factory default displays total pulses with no decimals)

To calculate the KFT factor, use the following formula:

KFT= 10000/K-FACTOR

Where:

- 10000 is a constant
- K-FACTOR is the average number of pulses per desired engineering unit that the transducer produces.

Remove the insignificant decimals often produced with this calculation because they result in displays with a misleading level of precision far exceeding the accuracy of the meter. Use a maximum of four digits regardless of decimal point position! Enter KFT without regard to the location of the decimal point in the display. **The desired decimal location is entered in the next procedure**. The largest acceptable number for KFT is 65535.

For example:

A flowmeter has a K-factor 2053.7 imp/Gal and the display should read in Gallons.

KFT = 10000/2053.57 = 4.869568 for Gallons

486957 is > 65535! 48696 > 4 digits! 4870 is best! Enter 4870 for KFT. For this example, KFR=4.870, the decimal point is set to three decimal places in the next procedure.

Set Decimal Point

Press and hold UP or DN to increase or decrease the value. To increase the increase or decrease rate, while holding the UP or DN, press and hold the SEL for medium rate or ENT for maximum rate. When the desired value is displayed, press ENT to store the programmed value and advance to the next variable.

Notice

Always release SEL or ENT before releasing UP or DN, or the LLC-BA will proceed to the next variable leaving the last variable with an unpredictable value.

Decimal Point for KFT

This variable selects the location of the decimal point in the KFR factor and the display. This display is always zeros with a decimal point.

0000000. (factory default)

Use the UP or DN key to move the decimal point left or right. Press ENT to store and advance to the next variable.

Engineering Units KFT

Enter the engineering units for display of rate with up to three characters or letters. Example: Gal

pul (factory default [pulses])

Program or edit the left-most character first. Press UP or DN until it appears. Then press SEL to store. Repeat the procedure for the second character. Repeat for the 3rd character but store with the ENT key. The LLC-BA will exit to the Display Mode.

This ends the variable programming procedure. The LLC-BA will display the currently selected mode. To initiate batch operation, the PROGRAM/RUN input must be closed (TERM 4 connected to TERM 2) to enter the RUN mode.

Batch Programming

The LLC-BA must be in PROGRAM mode to program batch quantities. Nine different batches (1-9) can be programmed. **You must enter program variables before the batch programming**. Batch quantities are based on the programmed KFT value, KFT engineering units and decimal point.

The maximum value you can enter for a batch is 429496 regardless of decimal place. Values greater than 429496 are not accepted. The more decimal places in the KFT, the smaller the batch that can be programmed. To program larger batches it may be necessary to reduce the number of decimal places in the KFT.

Example:

KFT = 214.38 and the desired batch is 6000.00. Ignoring decimal location, the value of 600000 is greater than 429496 and will not be accepted. The solution is to reduce the decimal places of the programmed KFT. With KFT changed to 214.4, batch is 6000.0. Ignoring decimal location, the value of 60000 is now less than 429496 and will be accepted.

To program a batch quantity, press the BATCH key (SEL). The display momentarily reads SET BATCH-->1 and then displays BATCH1-> 0000000. Pressing SEL again increments the batch number. With a batch selected, press and hold UP or DN to increase or decrease the batch quantity. To increase or decrease rate, while holding the UP or DN, press and hold the SEL for medium rate or ENT for maximum rate.

Notice

Always release SEL or ENT before releasing UP or DN, or the LLC-BA will proceed to the next variable leaving the last variable with an unpredictable value.

When the desired value displays, press ENT to store and advance to the next variable. This also activates the batch number and the LLC-BA unit will return to the Display Mode. To program another Batch quantity, repeat the above procedure. The BATCH key (SEL) and ENT key can be used for batch selection/activation when in the PROGRAM mode. When programming is complete, the PROGRAM/RUN input must be closed (TERM 4 connected to TERM 2) to enter the RUN mode and execute any activated batch.

This ends the batch programming procedure. The LLC-BA will display the currently selected mode. To initiate batch operation, set the RUN/PROGRAM key switch to the horizontal RUN position to enter the RUN mode.

Limited Warranty

AW Gear Meters warrants the product to be in good working order for a period of 1 (one) year from the date of purchase from **AW Gear Meters** or an Authorized **AW Gear Meters** distributor. Should the product fail to be good working order at any time during this 1-year warranty period, **AW Gear Meters** will, at its option, repair or replace the product at no additional charge except as set forth below. Repair parts and replacement products will be furnished on an exchange basis and will be reconditioned or new. All replaced parts and products become the property of **AW Gear Meters**. This limited warranty does not include service to repair damage to the product resulting from accident, disaster, abuse, or a n**on AW Gear Meters** modification to the product.

Limited Warranty service may be obtained by delivering the product during the 1-year warranty period to **AW Gear Meters** and provide proof of purchase date. If this product is delivered by mail, you agree to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to warranty location and use the original shipping container or equivalent.

For further information contact:

AW Gear Meters
8809 Industrial Drive
Franksville, WI 53126
Phone: (262) 884-9800
Fax: (262) 884-9810

ALL EXPRESS AND IMPLIED WARRANTIES FOR THIS PRODUCT INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF 1 (ONE) YEAR FROM DATE OF PURCHASE, AND NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THIS PERIOD. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER AS WARRANTED ABOVE, YOUR SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. IN NO EVENT WILL AW COMPANY BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR INCIDENTAL OR CONSEQUENTIAL DAMAGE ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, EVEN IF AW GEAR METERS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH MAY VARY FROM STATE TO STATE.